

On Wednesday, May 29, under the presidency of the Vice-Chancellor of Cambridge University, two topics were discussed; first, the advisability of various educational bodies recognising each other's certificates of admission was generally agreed upon, and afterwards the question of cooperation between the old boys' associations throughout the Empire was discussed. Dr. Gow (Headmaster of Westminster) spoke of the difficulties of organising permanent associations of old boys of English public schools who go to the colonies, while Mr. L. A. Adamson (Victoria Secondary Schools' Association) made the following suggestions:—(1) that it is desirable to form a union of the great boys' schools of the Empire; (2) that this will best be done through their "old boys'" associations; (3) that the League of the Empire be asked to act as the organising centre.

At the open meeting on May 27, Sir Philip Magnus presided, and Sir Horace Plunkett gave an address on agricultural education in which he traced the work that had been going on in Ireland, and said that the problem of rural life was to be solved mainly by education, general and technical. During the discussion, Lord Montagu pointed out that the farmer should be taught to appreciate technical instruction by practical demonstrations, and that the interest of the children should be awakened by nature-study.

Lord Elgin took the chair at a similar meeting on May 28, when the connection between elementary and secondary schools was discussed. The chairman pointed out that it was now the boast of Scotland that the path was open from the parish school to the university, and he thought that Scotland had done a great deal to bring about what is required. Several representatives from the colonies described in some detail the state of affairs in their own countries.

Meetings were arranged by the three standing sections of the League and other sections which were constituted for the occasion. The following is a list of sections with their chairmen:—History, Prof. Bury; nature-study, Sir John Cockburn, K.C.M.G.; museums, Lieut.-Colonel Plunkett; universities, Sir Arthur Rücker; technical, Sir Philip Magnus, M.P.; teaching of English, Prof. Saintsbury; training of teachers, Canon G. C. Bell.

Such a large number of papers were read in the various sections that it is impossible to summarise or even enumerate them here. In the technical education section many important aspects of the subject were dealt with in a series of special papers, which included the questions of training and research, both in this country and in the colonies.

The museums' section was chiefly occupied in passing the following useful resolutions:—

(1) "That the formation of school collections illustrative of science or art is a valuable aid to education" (proposed by Dr. R. F. Scharff).

(2) "That when school collections are made to illustrate natural history or other branches of knowledge, arrangements for the exchange of such collections between various parts of the Empire will assist the objects for which the League is instituted" (proposed by Dr. Chalmers Mitchell).

(3) "That teachers and others should discourage the making of such collections as might tend to the extermination of rare plants or animals, and should assist in preserving such objects by fostering a knowledge and love of nature" (proposed by Sir Harry Johnston, G.C.M.G.).

(4) "That this conference recognises the value of arrangements for the circulation of museum objects, as organised at the Victoria and Albert Museum, South Kensington, and at the Dublin Museum of Science and Art, at Sheffield Museum, and elsewhere, and warmly advocates an extension and development of the system" (proposed by Prof. Kidd).

(5) "That this conference recommends the organisation of a permanent collection of objects specially interesting and useful to those engaged in educational work, in connection with one of the great museums in London. That such a collection should include typical school museums and the outlines of a local educational museum" (proposed by Mr. John MacLaughlan).

In the nature-study section the following resolutions were carried:—

(1) "As nature-study gives that wide knowledge of the

world and its products which is required throughout life, it should be inculcated at all stages of sound general education, and this section recommends its earnest encouragement in the home, in the school, and in the outside world. Furthermore, this section trusts that the education authorities of the Empire will endeavour to extend and encourage knowledge self-gained from original observations, as a vitalising factor in the progress to full intellectual efficiency" (proposed by Mr. T. R. Ablett).

(2) "That the supply of teachers acquainted with true methods of nature-study being the greatest present requirement, special efforts be made to provide facilities for the proper preparation for the work, of students and teachers in training" (proposed by Miss Rees George).

The museum section arranged exhibits consisting of a large series of travelling cases from Dublin Museum, and one of the cases illustrating the structure of birds now being arranged in the Lawson Memorial Wing of Eton College Museum.

In connection with the nature-study section were a number of exhibits illustrating the main phases of nature-study in this country, including the work of the Royal Drawing Society. The hon. secretary of the section on May 27 gave a lantern lecture entitled "Illustrations of Nature-study."

A large series of photographs was sent by the Government of New Zealand illustrating its educational work, and a very large number of publishers and makers of apparatus exhibited in the trade section.

Mr. S. H. Butcher, M.P., acted as chairman of the official conference, and Mrs. Ord Marshall as honorary secretary.

THE BIOLOGY OF THE COLORADO BEETLE AND ITS ALLIES.¹

DR. TOWER, who is already well known as the author of a careful monograph on the development of colour in insects, has set forth in this bulky volume the results of his prolonged researches into the life-histories and interrelations of a group of plant-feeding beetles, one species of which is celebrated as a dreaded potato pest. The work certainly bears ample witness to the patience and ingenuity of this observer, who is one of that ever-increasing school of zoologists holding the view that further light can be thrown on the mysterious problem of evolution mainly by observation of and experiments on the living animal.

The first chapter treats of the geographical distribution of the genus *Leptinotarsa*; southern Mexico is regarded as the centre of origin of the group, whence it has spread southwards to the Isthmus of Panama and northwards to the United States. Much interesting information and speculation on the dispersal of the Colorado beetle *L. decemlineata* is supplied. Spanish caravans and wandering herds of bison are regarded as the agencies whereby the hooked and spined seed-pods of *Solanum rostratum*, the characteristic food-plant of *Leptinotarsa*, were transported from Mexico to Texas, Arizona, and the eastern slope of the Rocky Mountains; the insects followed in the track of their food-plant, and became established in these areas. The westward advance of civilisation in the middle of the nineteenth century brought with it the cultivated potato, which proved a most acceptable food to the beetles; all obstacles to the eastward extension of this destructive insect were now removed; in 1872 it had reached the Atlantic sea-board, and in less than fifty years it was generally distributed over the United States and southern Canada.

In chapter ii. the variation of colour patterns and structural characters is examined both qualitatively and quantitatively. The nature of the material not lending itself to minutely accurate measurements, the author has evolved a highly complicated series of formulae which express succinctly forms of coloration on different parts of the body; these formulae are "seriated into classes," and the percentage of individuals possessing given colour-formulae

¹ "An Investigation of Evolution in Chrysomelid Beetles of the Genus *Leptinotarsa*." By William Lawrence Tower. Pp. x+320; illustrated. (Washington. D.C.: Carnegie Institution of Washington, 1906.)

is recorded. The author proves to his own satisfaction "that the highly complicated methods of biometry are no more reliable in their results as far as this material is concerned than other methods far less cumbersome and slavish." The nature of coloration and its ontogeny in the adult beetles and in the larvæ is discussed in chapter iii., and Dr. Tower adheres to his former view that colour originates from definite centres, and all patterns are merely extensions of these centres; all species start in life with an identical arrangement of colour-producing centres, which become modified, suppressed, or accentuated in different stages and in different species. Strong evidence against atavistic influences on the colour-development is adduced in the case of three species. Large numbers of specimens in all stages of growth were subjected to the most various conditions of temperature and humidity, and the conclusion is reached that like results are produced by diverse stimuli, e.g. any factor, such as heat, above or below the normal has the effect up to a certain point of producing increased pigmentation, beyond that point, of retarding it. The author believes that stimuli applied before the germ-cells begin to develop produce somatic variations only, which are not heritable; on the other hand, if the beetles were subjected to abnormal conditions when their germ-cells were sensitive to such stimuli, heritable variations resulted, and he attributes the inheritance of characters produced in the experiments of Weismann, Standfuss, and others to the fact that the stimuli acted on sensitive germ-cells, not on the soma. The subject is open to considerable argument, and doubtful critics may be referred to pp. 212-5 of Dr. Tower's monograph for a complete exposition of his views. Of high interest are the observations on the protective value of the gaudy coloration of these beetles. All the species have on the elytra and round the edge of the thorax, rows of glands whence exudes an oily and distasteful fluid; young fowls turned loose in a potato field, where *L. decemlineata* was common, eagerly attacked the insects at first, but soon learnt to avoid them, and subsequently could not be induced to eat them even when offered in company with edible insects. Specimens with the yellow stripes of the elytra covered with blackened shellac were given to experienced fowls, and then were readily seized, but as soon as their distasteful properties were realised they were dropped.

Limitations of space forbid a discussion of the experiments on selective and pedigree breeding, but they are of much interest and of great importance; the experiments extended over several years, but were brought to an abrupt conclusion through the carelessness of some workmen; Dr. Tower has with indomitable perseverance recommenced them, and his final conclusions will be awaited with eagerness. In the last chapter Dr. Tower confesses the faith that is in him; he will have none of the "Weismannian id-biophore-determinant hypothesis." He puts his finger on the weak spot in the theory of de Vries, and asks how mutants fare under natural conditions; his experience with *Leptinotarsa* shows him that they are rigorously exterminated. Variations he regards as epigenetic, not predetermined, evolution is continuous and direct, and new species have arisen in migrating races by direct response to the conditions of existence, natural selection acting as the conservator of the race by limiting the variations to a narrow range of possibilities. R. S.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Mr. T. B. Wood, university reader in agricultural chemistry, has been appointed Drapers' professor of agriculture in the University. Mr. Wood has been secretary of the Board of Agriculture since the foundation of the board, and the marked success of the agricultural department at Cambridge is in no small sense due to his energy and initiative. The professorship was vacated owing to Prof. Middleton being appointed assistant secretary to the Board of Agriculture and Fisheries. Mr. Wood is the author of many scientific and practical papers on agriculture, and he is co-editor of the *Journal of Agricultural Studies*.

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Keith Lucas has been appointed an additional demonstrator in physiology; and F. A. Potts has been appointed assistant to the superintendent of the museum of zoology.

Demonstrations in practical physics will be given during the long vacation, commencing on Monday, July 8. The chemical laboratory of the University will be open for the use of students during the months of July and August. Notice is also given that during the month of July, Mr. Fearnside will deliver a course of elementary lectures on "The Study of Rocks."

An examination for one "Surveyors' Institution Scholarship" will be held on July 24-27. The scholarship will be tenable for three years, and of the value of 80*l.* per annum. Candidates will be examined in (a) elementary chemistry and physics; (b) more advanced chemistry, physics, botany, and geology.

OXFORD.—In the Convocation to be held on June 26, it will be proposed to confer the honorary degree of D.Sc. upon the following men of science, nominated by the Chancellor on the occasion of the Encænna following his installation:—Sir Norman Lockyer, K.C.B., F.R.S.; Sir Richard D. B. Howell, president of the Royal College of Physicians; Sir William Ramsay, K.C.B., F.R.S.; Sir William H. Perkin, F.R.S.; Prof. W. Watson Cheyne, C.B., F.R.S.; and Dr. Ludwig Mond, F.R.S.

THE report read at the annual meeting of the City and Guilds of London Institute on May 28 referred to the negotiations which have taken place with the Board of Education with the view of the Central Technical College of the institute being included in the scheme for the establishment of the Imperial College of Science and Technology at South Kensington. The draft provisions dealing with the purpose and scope of the new institution, and the manner in which the Central Technical College will be associated with the scheme, have been approved by the executive committee.

As was explained in an article in NATURE of May 16 (p. 56), the new Imperial College of Science and Technology is shortly to be incorporated in accordance with a charter which is to be considered immediately by a committee of the Privy Council. The suggested charter provides for the continuance of the Royal School of Mines and of the diploma of Associate of the Royal School of Mines, and the Central Technical College is to retain its individuality and to continue to exercise its privilege of awarding its diplomas of associate and fellow. A question was asked in the House of Commons on May 30 whether, under the proposed charter, it is intended also to retain the title and associateship of the Royal College of Science. The President of the Board of Education replied that the new governing body when established will consider the question and decide whether it is expedient to continue the name Royal College of Science and its diploma, and to secure to present associates of the college their existing privileges.

THE Imperial Department of Agriculture for the West Indies has established agricultural schools at St. Vincent, Dominica, and St. Lucia, and the result has been to provide a good practical training in agricultural science to a selected number of boys. Instruction is given in the theory and practice of agriculture and in agricultural botany and chemistry, in addition to the subjects of an ordinary education. Each boy receives daily training in raising the crops under cultivation and in the care of livestock. At each school a portion of the land is divided into experiment plots for testing varieties of different plants, the introduction of new plants of economic importance, and methods of controlling insect pests and fungoid diseases by insecticides and fungicides. Besides these facilities, the *Agricultural News* of Barbados reports that rabbit breeding is taken up, and pure-bred Belgian hares have been introduced in order to improve the local stock. Poultry raising also receives attention, and now, by the use of incubators, a good supply of well-bred chickens is available for disposal throughout the different islands. The pupils become acquainted with all the details of work in the field before the theoretical knowledge of science necessary for keeping abreast with agricultural progress is learned. It has been found that the blending of practical